# Tab 10-N

# Other Material

# Jeanne B. Funk

# Violence exposure in real-life, video games, television, movies, and the internet: is there desensitization?

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## Abstract

It is believed that repeated exposure to real-life and to entertainment violence may alter cognitive, affective, and behavioral processes, possibly leading to desensitization. The goal of the present study was to determine if there are relationships between real-life and media violence exposure and desensitization as reflected in related characteristics One hundred fifty four fourth and fifth graders completed measures of real-life violence exposure, media violence exposure, empathy, and attitudes towards violence. Regression analyses indicated that only exposure to video game violence was associated with (lower) empathy. Both video game and movie violence exposure were associated with stronger proviolence attitudes. The active nature of playing video games, intense engagement, and the tendency to be translated into fantasy play may explain negative impact, though causality was not investigated in the present design. The samples' relatively low exposure to real-life violence may have limited the identification of relationships. Although difficult to quantify, desensitization to violence should be further studied using related characteristics as in the present study. Individual differences and causal relationships should also be examined.
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## Introduction

It is encouraging that the rate of crimes of violence in the United States has dropped about 15 percent since 1999 (US Bureau of Justice Statistics, 2001). However, self-reported violent offending by American youth has not declined (US Department of Health and Human Services, 2001). Exposure to violence has been implicated as one cause of subsequent aggression and violence: It is believed that repeated exposure to real-life and to entertainment violence may alter cognitive, affective, and behavioral processes (Friedlander, 1993; Osofsky, Wewers, Hann, & Fick, 1993; Osofsky, 1995; Farrell & Bruce, 1997; Cooley-Quille, Boyd, Frantz, & Walsh, 2001).

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Despite decreasing rates of violent crime, adolescents and adults in the United States still experience over 6 million such crimes annually (US Bureau of Justice Statistics, 2001). Exposure to community violence may cause a variety of emotional reactions including fear, anger, anxiety and depression (Martinez & Richters; 1993; Osofsky et al., 1993; Ceballo, Dahl, Aretakis, & Ramirez, 2001). In children, such exposure may undermine the development of emotion regulation skills. Impaired emotion regulation may lead to desensitization to cues that normally trigger empathic responding, increasing the likelihood of aggressive or violent behavior (Osofsky, 1995; Eisenberg, 2000). Exposure to community violence may also increase the probability of violent behavior through the demonstration and reinforcement of violent attitudes, problem-solving strategies, and behaviors, and through alterations in related cognitive processes (Huesmann & Malamuth, 1986; Osofsky et al., 1993; Guerra, Eron, Huesmann, Tolan, & Van Acker, 1997).

Violence in entertainment media is also considered by many to be a major contributor to aggressive and violent behavior in real life (see, for example, Donnerstein & Smith, 1997; Huesmann, Moise, & Podolski, 1997; Anderson & Bushman, 2002; Sparks & Sparks, 2002). Screen-based media violence (television, movies, the Internet, and video games) is the most prevalent and most thoroughly studied source for children and adolescents. Some of the proposed mechanisms of impact are similar to those believed to be active in exposure to community violence: Demonstration and reinforcement of violent actions, desensitization to the real-life consequences of violence with increased proviolence attitudes, and alterations in cognitive processing (Huesmann & Malamuth, 1986; Rule & Ferguson, 1986; Cantor, 2000; Strasburger & Wilson, 2002; Funk, 2003). The impact of television violence has been especially well-studied (for examples, see Paik & Comstock, 1994; Bushman & Huesmann, 2001; Johnson, Cohen, Smailes, Kasen, & Brook, 2002; Wilson et al., 2002). There has been less focus on movie violence, though many of the mechanisms and conclusions ascribed to television apply (Pennell & Browne, 1999; Browne et al., 2002). Music videos are a related genre, however, one recent content analysis suggests that only 15% of the almost 2000 music videos reviewed contained violence (Smith & Boyson, 2002), and the specific impact of this music-based medium will not be further addressed here. Our understanding of the impact of exposure to violent content on the Internet is essentially uncharted territory (Montgomery, 2000; Tarpley, 2001), and the impact of video game violence is just beginning to be closely examined

*Video game violence*

As one of the newest and most prominent sources of screen-based media violence, special attention should be given to considering the possible impact of violent video games. It has been suggested that the active nature of video games makes them unique among the screen-based media (Funk & Buchman, 1996b; Wartella, O'Keefe, & Scantlin, 2000). Video game players actually participate in, and to some extent create the video game actions, rather than simply being a content recipient. In order to succeed at a violent video game, players must identify and then choose violent strategies. Repeated violent choices result in a continuous cycle of reward. Violence is presented as justified, without negative consequences, and fun (Funk, 1995). Some researchers assert that it has been proven that playing violent video games increases negative cognitions, affect, and behaviors (Anderson & Bushman, 2001). However, much more work is needed to

identify who is at most risk for negative impact and under what conditions negative outcomes are most likely (Funk, 2002a).

*Desensitization and moral evaluation*

Desensitization is one of the key mechanisms proposed for the effects of exposure to violence (Ceballo et al., 2001; Strasburger & Wilson, 2002). Desensitization means the attenuation or elimination of cognitive, emotional, and, ultimately, behavioral responses to a stimulus (Rule & Ferguson, 1986). The process of desensitization can be directly and purposefully manipulated. For example, systematic desensitization is a commonly used technique in behavior therapy whose aim is to reduce or eliminate certain emotional responses through graded and supervised exposure to anxiety-inducing stimuli (Wolpe, 1973). Systematic desensitization is a key component of therapeutic interventions for children, with documented effectiveness in changing feelings, emotions, and behaviors (Weersing & Weisz, 2002).

Desensitization to violence is a subtle, almost incidental process which may occur as a result of repeated exposure to real-life violence, as well as from exposure to media violence. Emotional desensitization is evident when there is numbing or blunting of emotional reactions to events which would typically elicit a strong response. Cognitive desensitization is evident when the belief that violence is uncommon and unlikely becomes the belief that violence is mundane and inevitable. Emotional and cognitive desensitization to violence decrease the likelihood that violent behavior will be either censored or censured.

Although often cited as a major outcome of violence exposure, empirical documentation of the phenomenon of desensitization to violence is limited. With respect to real-life violence, Farrell and Bruce (1997) surveyed 473 inner-city middle school students to determine their exposure to community violence and their level of distress and aggression. There were no significant relations between violence exposure and distress, though higher exposure was related to more aggression in girls. Farrrell and Bruce suggest that children with chronic violence exposure become desensitized to violence, which allows increased aggression.

Desensitization to media violence has been examined in experimental situations, as in the classic work by Drabman and Thomas (1974). In this study, children who viewed an aggressive film later took significantly longer to seek adult assistance to stop what they thought was an altercation between younger children, compared to the children who did not see the film. In a more recent replication using contemporary video materials, Molitor and Hirsch (1994) confirmed the original findings: viewing violence increases tolerance for violent behavior.

Desensitization may also be inferred by examining related processes which are affected by desensitization. For example, when desensitization occurs, the process of moral evaluation is disrupted because the individual does not perceive or respond to the cues that are necessary to initiate evaluative processes. As a result, actions may be taken without consideration of their moral implications. Empathy and attitudes towards violence are important components of the process of moral evaluation which may be affected by exposure to violence in real life or in the media. Blunted empathic responding may reflect primarily emotional desensitization, while cognitive desensitization may be apparent in stronger proviolence attitudes (Eron, 2001).

*Empathy and attitudes towards violence*

Empathy, the capacity to perceive and to experience the state of another, is critical to the process of moral evaluation (Tangney & Fischer, 1995; Eisenberg, 2000; Hoffman, 2000). Empathy develops in response to positive socialization experiences including the opportunity to view empathic models and to experience feedback about behavioral choices (Feshbach, 1997). A positive relationship between empathy and prosocial behavior is typically identified (Miller & Eisenberg, 1988; Krevans & Gibbs, 1996; Roberts & Strayer, 1996; Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000). Relationships between lower empathy and social maladjustment and aggression in youth have also been found (Boldizar, Perry, & Perry, 1989; Cohen & Strayer, 1996).

Violence in screen-based media may affect empathy by desensitizing viewers to the true consequences of violent actions (Strasburger & Wilson, 2002). Because of its active, creative nature, video game play could be expected to have a particularly strong relationship with empathic responding. Two studies have examined this association. Sakamoto's (1994) survey of 307 fourth, fifth, and sixth graders in Japan identified a negative relationship between simple frequency of video game use and lower empathy. Barnett et al. (1997) investigated game preference, self-esteem, and empathy in a survey of 229 15–19 year olds. Adolescents whose favourite game was violent had lower empathy scores.

Attitudes also contribute to the process of moral evaluation, especially attitudes towards violence. The formation of attitudes towards violence is probably influenced by many factors including the amount of exposure to violence in real-life and the media, and the attitudes of peers and parents (Rule & Ferguson, 1986; Vernberg, Jacobs, & Hershberger, 1999). Attitudes towards violence play an important role in the translation of negative cognitions and affect into behavior (Velicer, Huckel, & Hansen, 1989; Vernberg et al., 1999). In several studies, stronger proviolence attitudes in children and adolescents have been associated with aggressive behavior (Slaby & Guerra, 1988; Guerra & Slaby, 1990; Cotten et al., 1994; Tolan, Guerra, & Kendall, 1995; Huesmann & Guerra, 1997).

For most people, violence is much more prevalent in screen-based media than in real life. If the viewer develops the attitude that violence is normative, they may become desensitized and callous to violence in real life (Bushman & Huesmann, 2001). Media presentations of justified violence may also change the belief that violent behavior is wrong, encouraging the development of proviolence attitudes. As previously noted, violent video games have the added dimension that one creates and participates in violent actions. Such games condone, promote, and justify the use of violence while concealing realistic consequences. Violence is acceptable because it is not real, therefore "victims" do not really suffer. Playing violent video games could contribute to the development of proviolence attitudes because these games normalize violence and desensitize the player to the real-life consequences of violence.

Relationships between a preference for violent video games, attitudes towards violence, and empathy were examined in research with 52 sixth graders (Funk, Buchman, Schimming, & Hagan, 1998). Participants completed Bryant's Index of Empathy for Children and Adolescents (Bryant, 1982) and the Attitudes Towards Violence Scale (Funk, Elliott, Urman, Flores, & Mock, 1999a). They also listed and categorized up to three favourite video games using a system of six content categories previously developed with the help of children and adolescents (Funk & Buchman,

1995). It was anticipated that a stronger preference for violent games would be associated with lower empathy and stronger proviolence attitudes. Results were generally in the expected directions, though only marginally significant relationships with small effect sizes were found. Perhaps most interesting, children with a high preference for violent games and high time commitment to playing demonstrated the lowest empathy. The results of this preliminary study are intriguing, but much more research is needed to confirm possible relationships.

### The present study

Today's children and adolescents have many potential sources of violence exposure which may desensitize them to the true consequences of violence, increasing the relative risk of aggression or even violence (Friedlander, 1993; Johnson-Reid, 1998; Singer, Slovak, Frierson, & York, 1998; Groebel, 2001). The goal of the present study was to determine if there are relationships between real-life and media violence exposure and desensitization as reflected in empathy and attitudes towards violence. It was anticipated that higher exposure to violence in real life and in the media would be associated with lower empathy and stronger proviolence attitudes. Because of its active and creative nature, of the sources of media violence, exposure to video game violence was expected to have the strongest relationships.

## Method

### Participants

A sample of 150 students was recruited from elementary schools and a daycare center located in a mid-sized, Midwestern city. The elementary schools are religiously oriented private schools, primarily Catholic, and the daycare center is affiliated with the public school system. The sample included 82 boys and 68 girls from grades 4 and 5, with an average age of 9.99 (s.D. = 0.74). The racial backgrounds of the sample were primarily European American (58%) and African American (24%), reflecting the makeup of the community. Mothers' educational level is presented in Table 1. The sample is somewhat better educated and likely to be of somewhat higher socioeconomic status than the general population.

### Measures

Participants were asked to complete 4 questionnaires (order counterbalanced): a background questionnaire with demographic information and questions about media use and preferences; a survey with questions about real-life violence exposure across different settings; an assessment of children's attitudes towards violence; and a measure of children's empathy.

### Background questionnaire

In addition to basic demographic information (gender, age, grade, mother's education), the background questionnaire requested information about average time per week spent playing

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Table 1
Distribution of highest grade completed by mother

| Category | Frequency | Per cent |
|---|---|---|
| 8th grade or less | 1 | 0.7 |
| 9th to 11th | 3 | 2.0 |
| High school graduate | 9 | 5.9 |
| Some college completed | 19 | 12.5 |
| College graduate | 43 | 28.3 |
| Graduate school (attended or degree) | 32 | 21.3 |
| Don't know | 42 | 27.6 |
| Missing | 2 | 1.3 |

video games, watching television, watching movies (on videotape or in theatres), and using the Internet. Children chose from six time range categories: no time; 1–2 h; 3–6 h; 7–10 h; 11–14 h; more than 15 h. Children were also asked to categorize the content of up to three favourites in each of the four activities using definitions provided by the experimenter. For their favourite video games children used the Funk and Buchman (1995) categories described earlier. Definitions for the other categories were developed based on these categories and on a review of previous surveys of media use (see, for example, Wright et al., 2001) For favourite television programs children chose from the following categories: figuring out, learning, "educational"; cartoon characters; sports, no contact between players (example: golf); sports with contact between players (example: football); game show; talk show; story about real people with fighting or destruction; story about real people, no fighting or destruction; no favourite television show.

For favourite movies the categories included: figuring out, learning; sports, no contact between players; sports with contact between players; real people, fighting, destruction; real people, no fighting or destruction; cartoon characters; no favourite movie. For favourite Internet activity children selected from the following: chat rooms; instant messaging; play one-person games with violence; play one-person games without violence; play multiplayer games with violence; play multiplayer games without violence; consumer/shopping sites; look for information, educational; no favourite thing to do on the Internet; do not have access to the Internet.

*KID-screen for adolescent violence exposure (KID-SAVE; Flowers, Hastings, & Kelley, 2000)*

The KID-SAVE is a 34-item questionnaire developed to assess children's real-life violence exposure. It is an adaptation of the Screen for Adolescent Violence Exposure (SAVE; Hastings & Kelley, 1997), which is a self-report scale measuring the frequency of violence exposure in settings relevant to adolescents, such as home, school, and neighborhood. KID-SAVE was developed for use with third to seventh grade children. All items on the scale inquire about actual violent events the child has witnessed, events the child has heard about, or violence the child has experienced directly. Items include such statements as "I have seen someone carry a gun," "I have heard about someone getting killed," and "I have been attacked with a knife." Children are specifically instructed to include only real-life violent events. Each endorsed item is rated for Frequency

(0 = Never, 1 = Sometimes, 2 = A lot) and Impact (0 = Not at all upsetting, 1 = Somewhat upsetting, 2 = Very upsetting) A total score is calculated for Frequency of exposure; for the purposes of the present study, the KID-SAVE Impact Total was calculated using means in order to differentiate between children who had not been exposed to violence and therefore could not report any emotional impact and children who had been exposed to violence but did not report any emotional impact. Psychometric properties as reported by Flowers, Hastings, and Kelley and in further study by Flowers, Lanclos, and Kelley (2002) are acceptable. Cronbach's alpha for the Total Frequency Scale was 0.91; for the Total Impact Scale, Cronbach's alpha was 0.89 (Flowers, Hastings, & Kelley). The initial norm group was 90% African American and selected from a "high crime" area to obtain a sufficient range of scores. The mean score for Total Frequency of exposure to violence was 22.2, s.d. 11.3, range 1–59 (Flowers, Hastings, & Kelley).

*The attitudes towards violence scale: child version [Funk, Elliott, Bechtoldt, Pasold, and Tsavoussis (2003a)]*

The Attitudes Towards Violence Scale: Child Version (ATVC) is a 16-item self-report measure of children's attitudes towards violence that was originally developed to evaluate a specific violence prevention program. Children are instructed to read each statement and endorse one of four possible response choices reflecting their agreement with that statement (1 = No, 2 = Maybe, 3 = Probably, 4 = Yes). Items include statements such as "Parents should tell their kids to fight if they have to," and "People with guns or knives are cool." A total score is calculated across all items with higher scores indicating stronger proviolence attitudes. The ATVC has a meaningful two-factor solution: (a) Reactive Violence—violence used in response to actual or perceived threat and (b) Culture of Violence-a pervasive, ingrained identification with violence as an acceptable and valued activity. The ATVC demonstrates acceptable psychometric properties for the Total scale (Cronbach's alpha = 0.84) as well as for the Reactive Violence (Cronbach's alpha = 0.79) and Culture of Violence (Cronbach's alpha = 0.79) factor scores.

*Children's empathy questionnaire [Funk et al. (2003b)]*

The Children's Empathy Questionnaire (CEQ) is a 15-item self-report questionnaire which assesses a child's level of empathy. Similar to the ATVC, children are instructed to read each statement and endorse one of four possible response choices reflecting their agreement with that statement (1 = No, 2 = Maybe, 3 = Probably, 4 = Yes). Items include statements such as "When I see a kid who is upset it really bothers me," and "If two kids are fighting, someone should stop it." A total score is calculated across all items, with higher scores indicating more empathy. A strong one-factor solution (Cronbach's alpha = 0.71) was identified. Because this scale is in development, other psychometric data are not yet available.

*Procedure*

After obtaining informed consent from a parent or guardian and from the child, participants were tested in groups of approximately 10–20 students at their schools during times designated by the school principal or daycare administrator. An investigator was available in the classroom to

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answer questions. The majority of children were able to complete the measures without difficulty with minimal or no assistance, though some missed the reverse side of two-sided questionnaires. Complete data were available for 130 students.

## Results

### Preliminary analyses

A Violent Media Preference score was calculated for each of the four activities by computing the frequencies of violence category choices. Time per week spent for each activity was determined using the midpoint of the range endorsed by the child with two exceptions: when no time was endorsed the multiplier was zero and when 15 or more hours was endorsed the multiplier was 15. Means and standard deviations for frequency of violent media favourites and time spent for video games, television, movies, and Internet use are presented in Table 2. A Violent Media Exposure variable was then created for each activity by multiplying the percent of violent choices by the time spent per week for each activity. This procedure is similar, though not identical to, procedures used by other researchers in calculating exposure to media violence (see Anderson and Dill, 2000; Gentile, Lynch, Linder, & Walsh, 2003).

Means and standard deviations were computed by gender for the violent media exposure variables, and for the KID-SAVE, ATVC and CEQ. Results are presented in Table 3. A series of *t*-tests was performed to examine gender differences on the Frequency and Impact Total scales of the KID-SAVE, the ATVC Total, and the CEQ Total. Significant gender differences were noted on the KID-SAVE Frequency Total scale, $t(148) = 2.71, p < 0.01$. Although boys reported higher rates of exposure to violence, no significant gender differences were found on the KID-SAVE Impact Total scale. There was a significant difference between boys and girls on both the ATVC and CEQ Total scales, $t(148) = 2.62, p < 0.05$, and $t(148) = -3.72, p < 0.01$, respectively, with boys reporting stronger proviolence attitudes and girls reporting higher levels of empathy.

Correlations between study variables are presented in Table 4. Indices of multicollinearity were examined and no problems were identified.

### Violence exposure, empathy and attitudes towards violence

Regression analyses were performed to examine the relationships between real-life violence exposure as indicated by scores on the Total Frequency and Total Impact scales of the KID-SAVE, exposure to the four measures of media violence (video game, television, movies, and Internet) and the total CEQ score. Gender was entered first in the model, with real-life violence exposure entered in step two and the media variables in step three. Results of the regression are presented in Table 5. Apart from the expected relations with gender, only exposure to video game violence was a significant predictor of empathy scores, with more exposure related to lower empathy. There was a trend for a relationship between exposure to movie violence and empathy.

Regression analyses were performed to examine whether or not the responses of girls and boys to the CEQ were equally affected by their exposure to video game violence. We first constructed an orthogonalized two-way interaction variable using a partial Gram–Schmidt procedure (Burrill,

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Table 2
Means and standard deviations for violent favourites and average time per week by activity and by gender

|  | Boys | | | | Girls | | | |
|---|---|---|---|---|---|---|---|---|
|  | Viol. favourites[a] | | Time[b] | | Viol. favourites | | Time | |
|  | M | S.D. | M | S.D. | M | S.D. | M | S.D. |
| Video Games | 1.27 | 1.05 | 4.03 | 3.58 | 0.51 | 0.88 | 2.63 | 3.01 |
| Television | 0.16 | 0.49 | 5.64 | 3.62 | 0.14 | 0.46 | 2.85 | 3.75 |
| Movies | 0.86 | 0.98 | 3.14 | 2.78 | 0.71 | 0.82 | 2.85 | 3.23 |
| Internet | 0.40 | 0.61 | 2.81 | 4.52 | 0.12 | 0.41 | 1.80 | 3.25 |

[a] Possible range = 0–3.
[b] Possible range = 0–15 h.

Table 3
Means and standard deviations for media violence exposure variables, KID-SAVE, ATVC, and CEQ

|  | Total (N = 150) | | Boys (n = 82) | | Girls (n = 68) | |
|---|---|---|---|---|---|---|
|  | M | S.D. | M | S.D. | M | S.D. |
| Video games | 1.16 | 2.30 | 1.79 | 2.81 | 0.46 | 1.22 |
| Television | 0.16 | 0.55 | 0.23 | 0.70 | 0.01 | 0.28 |
| Movies | 0.80 | 1.41 | 0.90 | 1.56 | 0.68 | 1.20 |
| Internet | 0.27 | 1.17 | 0.43 | 1.48 | 0.01 | 0.60 |
| KID-SAVE |  |  |  |  |  |  |
| Total frequency | 12.40 | 6.99 | 13.77 | 7.29 | 10.80 | 5.84 |
| Total impact[a] | 1.24 | 0.45 | 1.27 | 0.39 | 1.19 | 0.53 |
| ATVC | 23.18 | 5.89 | 24.30 | 6.14 | 21.82 | 5.30 |
| CEQ | 42.14 | 5.00 | 45.63 | 6.75 | 49.49 | 5.72 |

*Note*: Media violence exposure variables include video games, television, movies and the Internet, calculated by multiplying the per cent of violent choices (possible range = 0–3) by the time spent per week for each activity (possible range = 0–15 h). KID-SAVE, KID-Screen for Adolescent Violent Exposure (possible range = 0–68 for Frequency and 0–2 for Impact); ATVC, The Attitudes Towards Violence Scale: Child Version (possible range = 16–64); CEQ, The Children's Empathy Questionnaire (possible range = 15–60). For these three measures, higher scores indicate more of the construct.
[a] Mean score was calculated for this variable instead of means of sum scores.

2003) We then tested a model predicting CEQ scores that included the primary and interaction variables. Gender and exposure to video game violence were entered in Step 1 of a regression analysis; the interaction variable was entered in Step 2. The two primary variables accounted for 12% of the variance in CEQ scores [$F(2, 137) = 10.67$, $p = 0.00$]. The two-way interaction explained an additional 0.2% of the variance in the CEQ score which was not significant [$F(1, 136) = 0.29$, $p > 0.05$].

Regression analyses were performed to examine the relationships between real-life violence exposure as indicated by scores on the Total Frequency and Total Impact scales of the KID-SAVE, exposure to the four measures of media violence (video game, television, movies, and

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Table 4

Correlations between gender, mother's education, violence exposure variables, empathy (CEQ), and attitudes toward violence (ATVC)

|  | Gender[a] | Mother ed. | Tot. freq | Tot. impact | VG | TV | Movies | Internet | CEQ | ATVC |
|---|---|---|---|---|---|---|---|---|---|---|
| Gender |  | 0.07 | −0.16* | 0.01 | −0.29*** | −0.13 | −0.09 | −0.15 | 0.33** | −0.21* |
| Mother ed |  |  | −0.05 | −0.01 | 0.01 | 0.14 | 0.02 | −0.07 | 0.02 | −0.09 |
| Tot. freq |  |  |  | 0.22** | 0.11 | −0.05 | 0.15 | 0.20* | −0.10 | 0.18* |
| Tot. impact |  |  |  |  | −0.07 | −0.12 | −0.07 | 0.03 | 0.01 | 0.01 |
| VG |  |  |  |  |  | 0.14 | 0.15 | 0.22* | −0.24** | 0.30** |
| TV |  |  |  |  |  |  | 0.30** | 0.20* | −0.04 | 0.14 |
| Movies |  |  |  |  |  |  |  | 0.31** | −0.18* | 0.36** |
| Internet |  |  |  |  |  |  |  |  | −0.17* | 0.24** |
| CEQ |  |  |  |  |  |  |  |  |  | −0.45** |
| ATVC |  |  |  |  |  |  |  |  |  |  |

$*p < 0.05$; $**p < 0.01$.

[a] Gender dummy coded as follows: boys = 0, girls = 1

Table 5

Summary of hierarchical regression analysis for variables predicting children's empathy scores

| Variable | $\Delta R^2$ | $B$ | s.e. $B$ | $\beta$ |
|---|---|---|---|---|
| Step 1 |  |  |  |  |
| Gender | 0.14 | 3.69 | 0.82 | 0.37** |
|  |  |  |  |  |
| Step 2 |  |  |  |  |
| Gender |  | 3.68 | 0.85 | 0.37** |
| Real-life violence exposure |  |  |  |  |
| Total frequency |  | −0.00 | 0.06 | −0.01 |
| Total impact | 0.00 | 0.47 | 0.95 | 0.04 |
|  |  |  |  |  |
| Step 3 |  |  |  |  |
| Gender |  | 3.20 | 0.86 | 0.32** |
| Real-life violence exposure |  |  |  |  |
| Total frequency |  | 0.00 | 0.06 | 0.05 |
| Total impact |  | 0.18 | 0.94 | 0.02 |
| Media violence exposure |  |  |  |  |
| Video games |  | −0.40 | 0.18 | −0.19* |
| Television |  | 0.67 | 0.90 | 0.06 |
| Movies |  | −0.57 | 0.34 | −0.15 |
| Internet | 0.08 | −0.50 | 0.59 | −0.08 |

$*p < 0.05$; $**p < 0.000$

Internet) and children's Attitudes Towards Violence scores. Results of this regression are presented in Table 6. Apart from the expected relationship with gender, only video game violence exposure and movie violence exposure predicted attitudes towards violence score, with more exposure predicting stronger proviolence attitudes.

Table 6
Summary of hierarchical regression analysis for variables predicting children's attitudes towards violence scores

| Variable | $\Delta R^2$ | $B$ | S.E. $B$ | $\beta$ |
|---|---|---|---|---|
| Step 1 | | | | |
| Gender | 0.06 | −2.71 | 0.96 | −0.24** |
| | | | | |
| Step 2 | | | | |
| Gender | | −2.39 | 0.98 | −0.21* |
| Real-life violence exposure | | | | |
| Total frequency | | 0.10 | 0.07 | 0.13 |
| Total Impact | 0.02 | −0.82 | 1.11 | −0.07 |
| | | | | |
| Step 3 | | | | |
| Gender | | −1.50 | 0.92 | −0.13 |
| Real-life violence exposure | | | | |
| Total frequency | | 0.00 | 0.07 | 0.06 |
| Total impact | | −0.00 | 1.00 | −0.00 |
| Media violence exposure | | | | |
| Video games | | 0.54 | 0.20 | 0.23** |
| Television | | 1.20 | 0.96 | 0.10 |
| Movies | | 1.15 | 0.36 | 0.28** |
| Internet | 0.21 | 0.86 | 0.63 | 0.12 |

$*p<0.05$; $**p<0.01$.

Regression analyses were performed to examine whether or not the responses of girls and boys to the Attitudes Towards Violence Scale (ATVC) were equally affected by their exposure to video game violence. We first constructed an orthogonalized two-way interaction variable using a partial Gram–Schmidt procedure (Burrill, 2003). We then tested a model predicting ATVC scores that included the primary and interaction variables. Gender and exposure to video game violence were entered in Step 1 of a regression analysis; the interaction variable was entered in Step 2. The two primary variables accounted for 10% of the variance in ATVC scores $[F(2, 136) = 7.88, p = 0.00]$. The two-way interaction explained an additional 1.3% of the variance in the ATVC scores, which was not significant $[F(1, 135) = 2.05, p > 0.05]$. A similar procedure was used to examine whether or not the responses of girls and boys to the Attitudes Towards Violence Scale (ATVC) were equally affected by their exposure to movie violence. The two primary variables accounted for 17% of the variance in ATVC scores $[F(2, 137) = 15.06, p = 0.00]$. The two-way interaction explained an additional 1.3% of the variance in the ATVC scores, which was not significant $[F(1, 136) = 2.07, p > 0.05]$.

**Discussion**

The purpose of the present study was to examine relationships among violence exposure in the media and in real-life and desensitization as reflected in empathy and attitudes toward violence. As anticipated, exposure to video game violence was associated with lower empathy and stronger proviolence attitudes. This finding provides further support for concern about children's exposure

to video game violence, particularly if granted that lower empathy and stronger proviolence attitudes indicate desensitization to violence. In violent video games empathy is not adaptive, moral evaluation is often non-existent, but proviolence attitudes and behaviors are repeatedly rewarded. Even if children with pre-existing lower empathy and stronger proviolence attitudes are simply drawn to violent video games, this exposure is unlikely to improve empathy or decrease proviolence attitudes.

Intense, engagement is another potential reason for concern about violence in video games because such engagement may increase the probability that game behaviors will generalize outside the game situation. Qualitative research suggests that children do experience intense engagement For example, one child in a focus group addressing children's interest in violent video games reported: "And sometimes you get so into it you don't want to stop" (Funk, 2002b). Focus group children also reported later copying characters' actions in fantasy play, for example saying: "They try to act like them, like wrestling." One child qualified his endorsement: "But not killing. Like if the game has you killing something or whatever." Other research suggests that the content of children's fantasy play may be an important marker. For example, in one recent study "difficult" preschoolers were more likely to engage in violent fantasy play than children without behavioral difficulties (Dunn & Hughes, 2001). "Difficult" children also demonstrated lower empathy in a 2-year follow-up. Understanding the importance of relationships between children's fantasy play and later empathy requires much more study, but it seems reasonable to conclude that, at least for some children, playing violent video games contributes to violent fantasy play.

Individual differences may increase a child's vulnerability to negative impact from playing violent video games. For example, there were 17 girls in our sample who reported playing more than the mean for girls each week. In some cases, these were also girls with a strong preference for violent video games. Typically, boys play more and prefer more violent video games than girls (Funk & Buchman, 1996b). It seems possible that girls with more exposure to violent video games may be at higher than average risk to experience negative impact because their behavior violates gender norms (Funk & Buchman, 1996a). Younger age may also be a risk factor for exposure to violent video games. Prior to adolescence, children are still developing their moral scaffolding (Eisenberg and Fabes, 1998). The values operative in violent video games may be more likely to have lasting impact on children who are still developing moral reasoning principles as a guide to prosocial behavior than on individuals with established value systems.

The present research did not identify strong relationships between exposure to real-life violence and study measures of desensitization. Compared to KIDSAVE norms (based on "high crime" areas), children in the present group had modest real-life violence exposure which may have limited the identification of meaningful relationships. There may be a critical threshold for real-life violence exposure which was not reached for the present sample Alternately, the sample size may have been too small to detect a small effect.

Among the other media variables, a relationship was found only for exposure to movie violence. For each source, the violence exposure variable was composed of both content and time commitment, recognizing the importance of considering both elements of media exposure (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001). Time reported may have influenced the failure to find a relationship between television violence exposure and the study variables Across all content categories, boys reported an average of 5.6 h of viewing per week, while girls reported only 2.9. This is considerably less than the typical time commitment reported in national

surveys (Roberts, Foehr, Rideout, & Brodie, 1999; Wright et al., 2001). The possibility that children have become so densensitized to violence on television that they are unlikely to consider it worth mentioning must also be examined. A review of the list of program names and the children's chosen category challenges this hypothesis. In most cases the children's categorization corresponded with the adult experimenter's perception. For example, one child whose most favourite television program was "Power Ranger" categorized it as a "story about real people with fighting or destruction." "Lizzie McGuire," a frequently cited favourite, was typically categorized as a "story about real people without fighting or destruction." Although children in the present sample probably underestimated their time spent watching television, they seem to have categorized program content in a realistic manner.

It was much more likely for a child to report a preference for violent video games or movies than for violent television or violence on the Internet (see Table 2). Only about 5% of television choices fell within the one category with violence. This may be due in part to the fact that there was not a separate category for cartoons with violence, and cartoons made up about half of children's reported favourites. However, for movies there was also only one violence category, and there relationships were found. It is possible that the nature of the sample contributed to some bias as the participants were drawn primarily from Catholic schools, with higher maternal education than the general population. These parents may be vigilant in monitoring television content. However, this does not appear to be true for violent video games or violent movies, with, respectively, one-third to one-quarter of preferences being violent. Past research indicates that parents often do not know the content of their children's favourite video games (Funk, Hagan, & Schimming, 1999c). Parents may also be less aware of the movie content children watch, particularly when there is easy access to a range of options through cable or satellite. Therefore, children may have inadvertent and unintended violence exposure via video games and movies. Parental monitoring would be enhanced if the various entertainment industries would agree on one standard ratings system (Funk, Flores, Buchman, & Germann, 1999b; Walsh & Gentile, 2001).

It has long been acknowledged that the media contribute to how individuals construct reality. For many, American reality includes an acceptance of violence coupled with desensitization to its true consequences. Desensitization to violence is a concept which is difficult to statistically capture as the condition itself may limit labeling exposure, either real or media-based, as violent. Because desensitization is difficult to quantify, we chose to measure related characteristics expected to be affected by desensitization. However, the question as to how low empathy or how high proviolence attitudes must be to label an individual "desensitized" was not addressed and remains a study limitation and a question for future research. In addition, relationships identified between sources of violence exposure and indicators of desensitization do not necessarily translate into causality. Future research should examine relationships between several indices of desensitization and all potential sources of violence exposure in real-life and in the media, and should address causality.

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